

# S5-PCLink

Ethernet-Gateway for Siemens S5 Controller

## User Manual

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# 1 Hardware

The S5-PCLink will plug directly into the PG-Port of your S5. It uses the +24V of your S5 PLC for power. If your model of S5 PLC does not have +24V, you can externally power the S5-PCLink by connecting it (with the green plug) directly to a power supply.

The green LED on the front of the network plug displays the link status of the network.

LED off => there is no connected network.

LED on => network is connected. The LED will be flashing if data is being transferred.

The round green LED displays the state of the PLC communication.

LED off => module power off or is in start up.

LED on => PLC is online and module is awaiting data.

LED is flashing slowly and no network is connected => searching for PLC, no PLC online.

LED and network link state are flashing => there is communication to the plc.

## 2 Supported Protocols

### **Programming with the virtual COM-port:**

With the "PLC-VCom", software supplied with the S5-PCLink you can communicate to the S5-PCLink via virtual COM-port which allows you to program the S5 PLC over the network.

The S5-PCLink module has an integrated multiplexer so you can program the S5 PLC via one connection and support an HMI or connect to a visualization program on another PC with AS-511.

### **Communication with other devices**

To communicate with other devices you can also use the two connections. For this there are 3 types of protocols provided. S5-PCLink will automatically recognize the correct protocol.

#### **1. S5-LAN-LINK**

S5-LAN-LINK has a special protocol for communication with the PC. For this communication you need a DLL. In this document this DLL will be written down. There is no security of this protocol.

#### **2. H1-ISO-on TCP (RFC1006) (you need firmware V 0.32)**

This protocol, from Siemens, will be used in the S5-world for to communicate with the CP1430TCP via Ethernet. This requires you to define TSAP and SSAP. S5-PCLink uses the entire name you define for SSAP or TSAP.

You can also use this protocol to communicate with WinCC (use the S5 TCP/IP layer 4).

**If you want to use this protocol you have to define the S5-server-port for 102.**

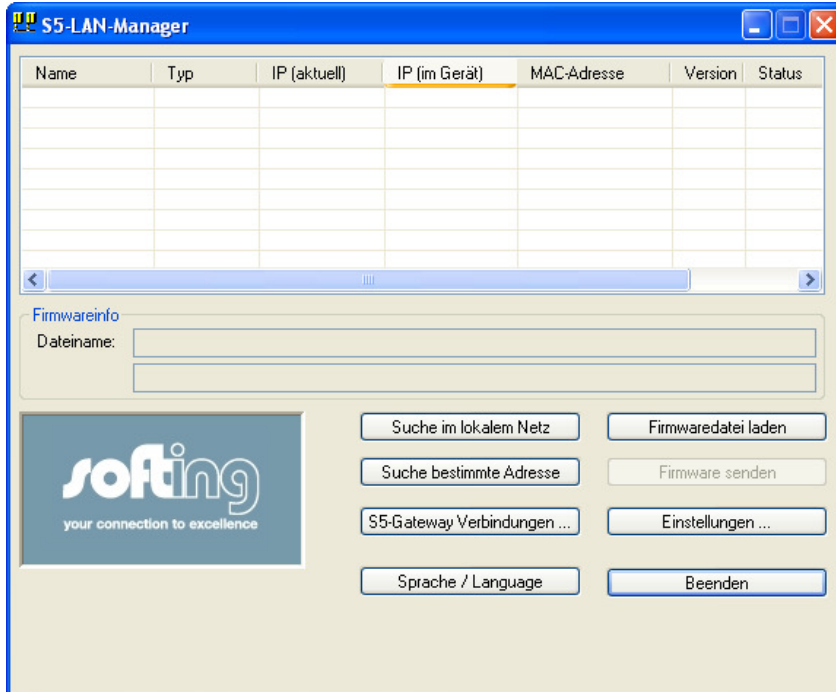
#### **3. VIPA-S5-TCP**

This protocol, from VIPA, will be used in the S5-world to communicate with VIPA's own PLC via Ethernet. If you want to use this protocol, you have to define in the module the S5-server-port.

### 3 Software

#### S5-PCLink-Manager

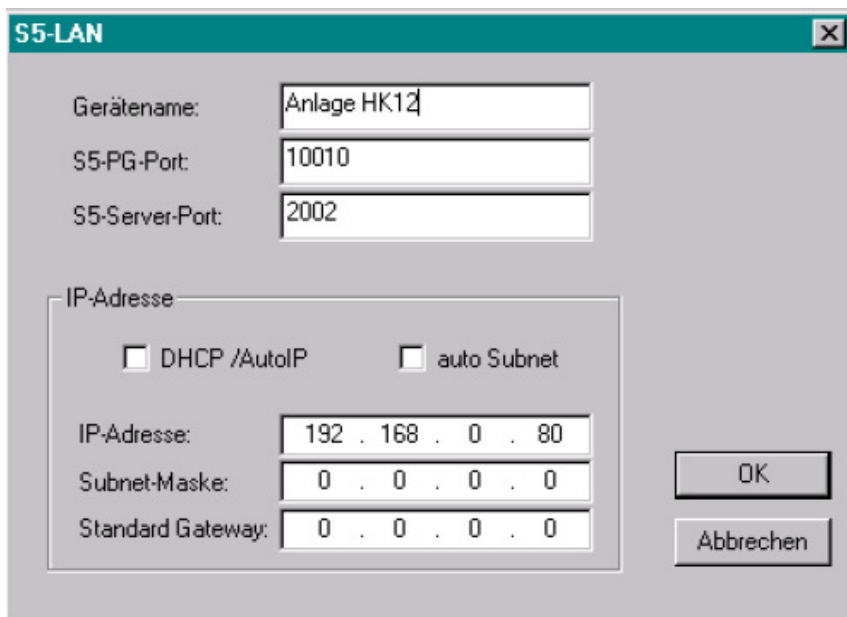
When you click on the button **“Suchen”**, the software will *“search”* for all the S5-PCLink modules connected to the network. These modules will be listed in the table.



#### Configuration of the device

Select the module in the table that you want to work with and click on the button **“Einstellungen”**.

The following dialog box with *“parameters”* will open:



This is where you can establish the parameters you want to use.

**Gerätename** *“Device Name”*

This name will identify the module in the table and make it easier to identify which PLC you want to connect with.

### ***S5-PG-Port***

TCP/IP-port number, this is used for "programming software" communication to the plc. Normally it should not be changed.

### ***S5-Server-Port***

The TCP/IP-port-number is where you can define the type of protocol you want to use for communication. You would use it for the S5-PCLink-Link-protocol or the VIPA-protocol. For H1-ISO-on TCP (RFC1006) you have to define it as 102 because this will be the RFC1006-port.

### ***DHCP/AutoIP***

If this box is checked, the module will be looking for a DHCP-server when it starts up. If the DHCPserver is not found after 3 attempts (it will run for some seconds) the module will use an IP-address from the auto-IP-address-range.

### ***auto Subnet***

If this box is checked, the module automatically selects the right subnet mask. For instance, for an IP address of 192.168.0.80 the correct SubNet-mask is 255.255.255.0 , you do not have to configure it.

### ***IP-Adresse***

If "DHCP/AutoIP", is switched off, you can define the IP-address you want to use it.

### ***Subnet-Mask***

This is where you define the SubNet-mask you want to use it. If you define 0.0.0.0 the module uses Auto-SubNet-mask.

### ***Standard-Gateway***

If the S5-PCLink will be connected to a router, this is where you can define the IP-address of the router. By pressing the OK-Button all the configured data will be saved in the S5-PCLink-module.

## 4 S5-LAN-LINK-Protocol

The S5-LAN-LINK-protocol will take priority over a configured S5-server-port from the S5-PCLink. At the present time only one connection to the S5-PCLink at a time is possible. The S5-PCLink module works the same way as a TCP/IP-server works, this means it is always "listening".

The protocol is based on a request/response principle. The client (PC) sends a request block (such as described below) to the module via TCP/IP. If the PC wants to read data from the PLC, it sends a request block to the S5-PCLink module. If the PC wants to write data to the PLC, it sends a request block with the data to the PLC. At that time the S5-PCLink module will process the data. During the processing time you cannot send a new request block to the S5-PCLink module. After the S5-PCLink module has processed the data it sends a response block to the PC. The format of the response block is the same as the request format. With the **Err-field** you can check the result of this action.

### ***Read data from the S5 PLC***

1. Make a request block and send it to the S5-PCLink
2. Wait for the answer, the wait time is dependant on the size of the requested data. Time: about 50ms + number of bytes X 1.5ms
3. Check response block ( proof the Err-field)
4. If the requested data can be read from the S5-PCLink module, it will follow the response block
5. If you want to get the data in bytes, you will receive it byte after byte.
6. If you want to get the data in words, you get the data as LOW-Byte, High-Byte.

### ***Write data into the plc***

1. Make the request block and prepare the data you want to send. If you want to send the data in word, then place the Low-Byte in front of the High-Byte.
2. Send the request block and data in one cycle
3. Wait for the answer, the wait time is dependant on the size of the requested data. Time: about 50ms + number of bytes X 1.5ms
4. Check response block ( proof the Err-field)
5. You will get only a response block from the module, no data.

**Requestblock/Responseblock.**

Byte = 8 Bit

WORD = 16 Bit

integer = 16 Bit with sign

<b>Datentyp</b>	<b>Name</b>	<b>r/w</b>	<b>Funktion</b>
BYTE	PLCType	r/w	PLC – type
WORD	Interface	r/w	Interface number
BYTE	PLCNo	r/w	PLC – address
BYTE	HdLen	r/w	length of this header in byte
BYTE	Cmd	r/w	command, for e.g. 'R' = read
BYTE	DataType	r/w	Type of data related to # “Cmd“
BYTE	DataArea	r/w	data area in the plc
WORD	DBNo	r/w	block number
WORD	Start	r/w	Start byte / start word
WORD	Count	r/w	Number of data types
integer	Err	r	failure code
WORD	VersionNo	r	version number
BYTE * 4	UserCode	r/w	code, can be used by the user
BYTE * 4	Reserved	r	4 bytes reserved for future extension
BYTE * n	Datenblock	r/w	optional data is on dependent whether its a read or write

**the fields in the detail****PLCType**

Type of PLC which is to be addressed is specified. Must be set on ' 5 ' = 35Hex.

**Interface**

Is set to zero, in later versions one will be used.

**PLCNo**

Is set to zero, in later versions one will be used which is intended for S7-MPI.

**HdLen**

Is the maximum length of the request block (without data) in bytes. At present 26 byte.

**Cmd**

The type of the command is set.

'R' or 'r' = read

'W' or 'w' = write

**DataType**

Select the data type:

'B' byte (8Bit)

'W' word (16 Bit)

**DataArea**

Determine the data area in the PLC:

- 'M' MW: Indicator
- 'A', 'O' Process image of exits
- 'E', 'I' Process image of entrances
- 'T' Timer (only word orientated)
- 'Z', 'C' Counter (only word orientated)
- 'D' Data component (only word orientated)
- 'X' DX component (only word orientated)

### **DBNo**

Number of the data and/or of the DX components. We only evaluate DATA AREA DB or DX.

### **Start**

Start byte or start word number; dependent on DATA type.

### **Count**

Number of units

### **Err**

- 0 Action successful during read, reading the data follow
- 2 Data area in the PLC missing, the DB is missing.
- 6 LAN module recognized; wrong request format
- 3 Desired range too small (e.g. DB too small)
- 7 Data size exceeded, max. 2048 bytes
- 9 Exceeded the time allowed with PLC
- 10 The module received too little data

### **Version Nr**

Version number of the firmware of the module.

Version 1.04 is shown as 104

### **UserCode**

These 4 bytes can be used for your own purposes.

### **Reserved**

Reserved for future extensions

### **Datenblock**

This is where the usable data is located. DB 10 starting from DW5 20 words, then there are 40 bytes of usable data (Low byte / High byte sequence)



**For SIMATIC S7:**

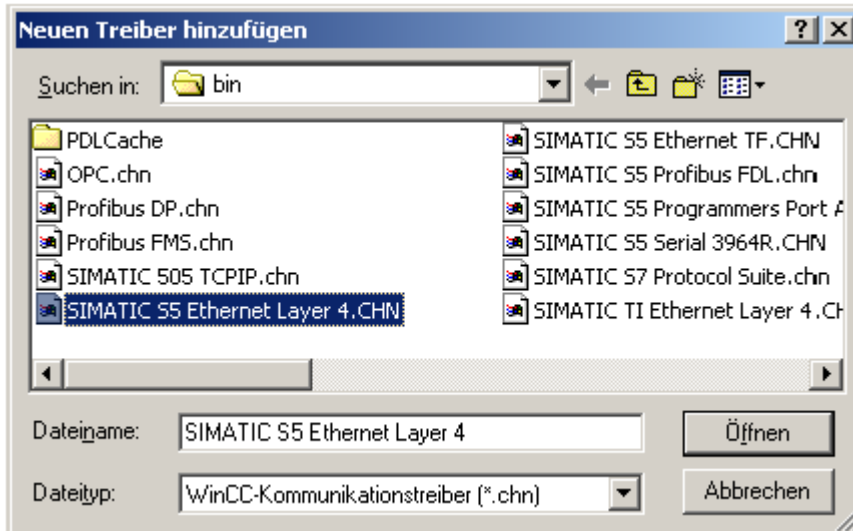
<b>Datentyp</b>	<b>Name</b>	<b>r/w</b>	<b>Funktion</b>
BYTE (0)	Interface_LoByte	r/w	0
BYTE (1)	PLCType	r/w	PLC – type
BYTE (2)	PCLNo	r/w	PLC – address
BYTE (3)	Interface_HiByte	r/w	Interface number
BYTE (4)	Cmd	r/w	Command type, for e.g. 'R' = read
BYTE (5)	HdLen	r/w	length of this header in bytes
BYTE (6)	DataArea	r/w	data area in the plc
BYTE (7)	DataType	r/w	Type of data related to # “Cmd”
WORD (9)(8)	DBNo	r/w	block number
WORD (11) (10)	Start	r/w	Start byte / start word
WORD (13) (12)	Count	r/w	Number of data types
Integer (15,14)	Err	r	failure code
WORD (17,16)	VersionNo	r	version number
BYTE * 4	UserCode	r/w	code, can be used by the user
BYTE * 4	Reserved	r	4 bytes reserves for future extension
BYTE * n	Datenblock	r/w	optional data is on dependent whether its a read or write

## 5 WinCC Communication with S5-PCLink

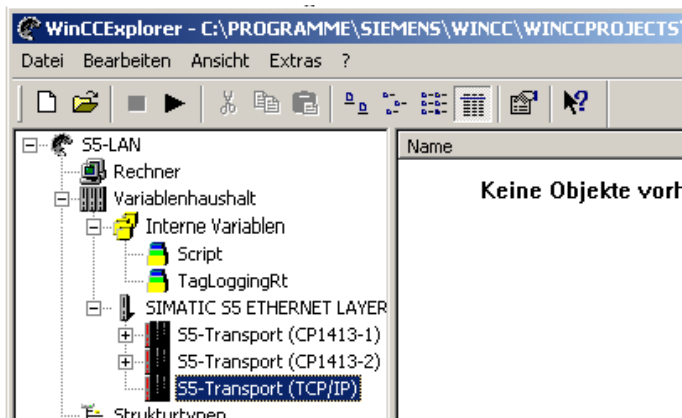
To communicate with S5-PCLink under WinCC use the following set-up:

### Set the S5-lan as server Port 102!

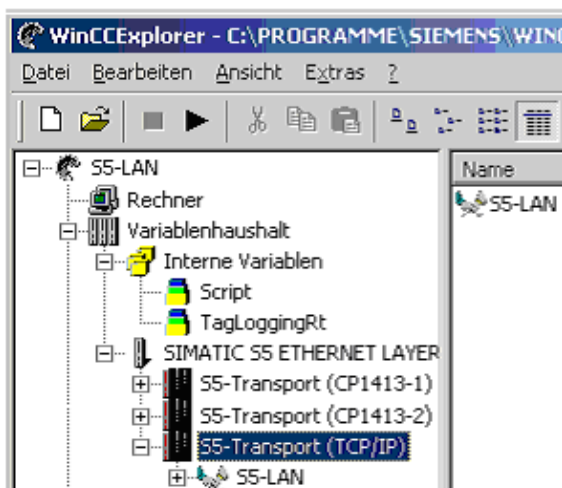
Add a new driver. Select "SIMATIC S5 Ethernet Layer 4.CHN"



This opens the following picture:



Put a new connection under S5-Transport (TCP/IP). In our example this is called "S5-PCLink"



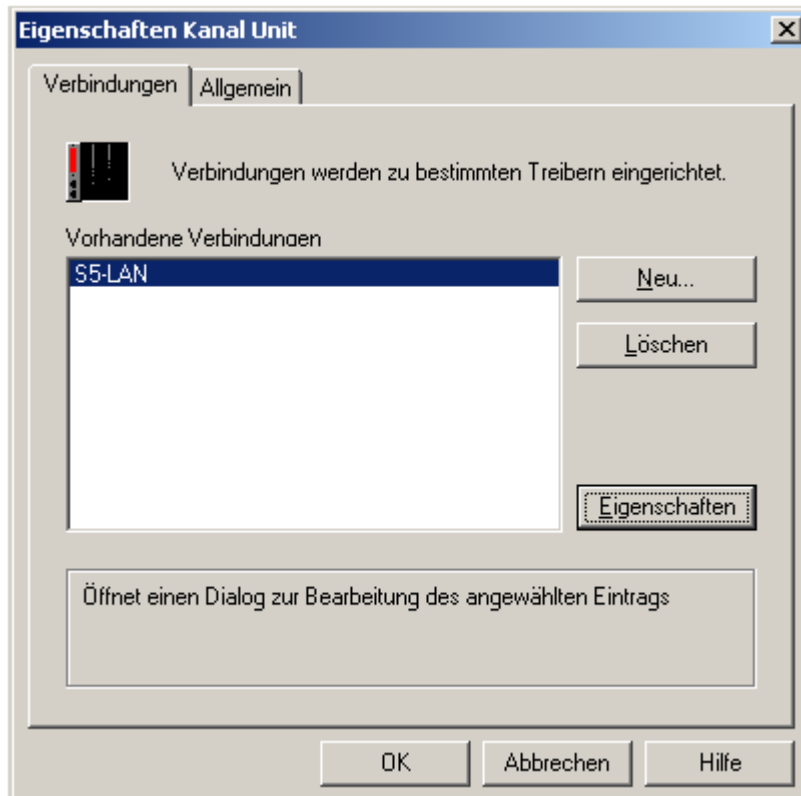
*New connection with S5-PCLink is established.*

Now the parameters need to be setup. Select "S5-Transport (TCP/IP)". With the Right Mouse Button in the menu, select "system parameters". In the folder "transportation parameter" you will find the following parameters.

The "S5-LAN"connection still must be configured.

With the right mouse button select S5-LAN and then "Eigenschaften".

In the next dialog box select Eigenschaften again.



**Eigenschaften Verbindung**

Allgemein Gruppen Variable

Name:  Eigenschaften

Unit:

Serverliste

Achten Sie bitte darauf, dass der Namen der Verbindung keine nationalen Sonderzeichen und nicht die Zeichen \$ ' und \* enthält.

OK Abbrechen Hilfe

This is the dialog box where you enter the connection parameters.

The IP address of the S5-PCLink in the example is 192.168.0.99.

Select "Fetch active".

The data you defined as TSAP is not important to the enterprise over S5-PCLink.

Do not forget to define the port 102 in the S5-PCLink as server port.

**Verbindungsparameter**

Transport-Verbindung

IP-Adresse

READ-Funktion

☒ Fetch Aktiv, Auftragsstyp von Partner ist READ-PASSIV

☐ Fetch Passiv, Auftragsstyp von Partner ist WRITE-AKTIV

Eigener TSAP  Hex

Fremder TSAP  Hex

WRITE-Funktion, Auftragsstyp von Partner ist WRITE-PASSIV

Eigener TSAP  Hex

Fremder TSAP  Hex

OK Abbrechen Hilfe

## assign of PG-PC-interface

As the S5-Layer-4 driver also uses the selected network card you must define the point of entry where the (TCP\_IP) in the PG PC Interface (system control) is assigned and established.

This is done in the following way:

Move to the system control and call "PG/PC interface adjust".

Under "point of entrance to the application, TCP\_IP" "should" exist.

If this entry is missing, then you can establish the point by selecting < adding/deletion > which will open the correct dialog box.

For a "new point of entrance" you insert: "TCP\_IP:"; and assign the name you want to use.

Using "adding" you can establish a new point of entry.

Establish the point of entry for "TCP\_IP:" and also for the selected network card.

